FOREST HEALTH PROTECTION
Pacific Southwest Region

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FHP Report No. C03-04

August 22, 2003

EVALUATION OF MORTALITY ON PIUTE MOUNTAIN,
GREENHORN/ CANNELL MEADOW DISTRICT,
SEQUOIA NATIONAL FOREST

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Background

In early July, 2003, personnel from the Sequoia National Forest observed increased levels of Jeffrey pine and white fir mortality in the Piute Mountains on the Greenhorn/ Cannell Meadow (GH/CM) District. On August 5, Dave Freeland, GH/CM District Ranger, Lew Jump, Giant Sequoia Inventory Specialist, Ray Huber, Ecosystem Manager, GH/CM District and John Wenz, Forest Health Protection (FHP) entomologist, visited the area. The purpose of the visit was to conduct an initial assessment of the mortality and discuss potential management alternatives.

Observations

Increased levels of Jeffrey pine and white fir mortality and top-kill were observed throughout an area generally north, northwest and northeast of Piute Peak, south, southwest and southeast of Inspiration Point and east of King Solomons Ridge to the western reaches of Bright Star Canyon. Approximate locations with mortality include T28S R33E sec. 10-15, 22-25 and 36 and T28S R34E sec. 8-10, 15-22 and 28-30.

The mortality and top-kill are not concentrated in discrete, large, contiguous patches but are scattered, more or less regularly, throughout the area in small groups that range from

less than an acre to about five acres in size. Based on tree condition, the mortality looks to have been increasing over a three to four year period. Overall, an estimated 10,000 to 15,000 acres are affected. The mortality appears to be about 75% to 80% white fir and 20% to 25% Jeffrey pine. Mortality was especially evident in the Clear Creek watershed between King Solomons Ridge and the Saddle Springs Road (27S02) and on the ridge east of Alaska Flat along and below road 28S24. Small groups of pinyon pine mortality, usually less than 10 trees/group, were observed on the eastern side of the area along the Piute Mountain Road (501) and in the Kelso River drainage (generally T28S R43E sec. 25-27 and 34-36). Scattered groups of Jeffrey pine mortality were present in the vicinity of Landers Meadow and Claraville Flat (generally T29S R34E sec. 2-4 and 9-11).

Several interrelated factors are associated with the increased mortality and top-kill.

1) Bark and Engraver Beetles (Coleoptera: Scolytidae). The fir engraver, *Scolytus ventralis*, is associated with the white fir mortality and *Ips* spp. (probably *I. pini* and/ or *I. emarginatus)* are associated with the Jeffrey pine mortality. The Jeffrey pine beetle, *Dendroctonus jeffrey*i, may also be associated with some of the Jeffrey pine mortality. Secondary wood borers, including roundheaded wood borers (Cerambycidae) and metallic wood borers (Buprestidae), are also present in many of the dead and dying Jeffrey pine and white fir.

2) Dwarf Mistletoe. Western dwarf mistletoe, *Arceuthobium campylopodum*, was observed irregularly distributed on Jeffrey pine throughout the affected area. The severity of infection is variable, but many trees and stands appeared to be heavily infected. Heavy dwarf mistletoe infections can reduce growth and help predispose trees to attack by bark and engraver beetles.

3) Stand Conditions. Stands throughout the area consist primarily of white fir and Jeffrey with minor amounts of black oak. Essentially pure Jeffrey pine stands occur in the vicinity of Landers Meadow and Claraville Flat and pinyon pine stands are prevalent on the east side of the area. A large proportion of the stands are overstocked. Increased between-tree competition in overstocked stands reduces tree vigor and the ability of trees and stands to withstand drought and contributes to increased susceptibility to bark and engraver beetle attack.

4) Drought. Below normal precipitation resulting in moisture stress can be a critical factor in predisposing trees to bark and engraver beetle attack. Precipitation data specific to the Piute Mountain area are not readily available. However, data from three of the closest weather monitoring sites (Isabella Dam, Kern River Intake #3 and Kern River Power House #3) show precipitation ranging from 59% to 84% below normal between 1999-2002. Precipitation for 2003 ranges from 117% to 126% of normal but about 50% of that precipitation occurred in a single storm event in November 2002. These data suggest that the Piute Mountain area may also have experienced below normal precipitation and some level of moisture stress over the last four to five years.

Management Options- Discussion

The combination of stand conditions (overstocking) and disease (western dwarf mistletoe) will continue to predispose trees to bark and engraver beetle-related mortality and top-kill. Without management action, mortality and top-kill can be expected to continue at above "normal" background levels. Mortality levels may fluctuate from year to year, but over time, will likely be higher than in unmanaged stands. Periods of drought will exacerbate the situation and substantially contribute to higher levels of mortality.

The increased mortality and top-kill will result in unplanned openings in the canopy of various sizes and an increase in the amount and distribution of standing and down dead woody material. The impacts, positive and negative, of the increased mortality will depend on the management goals and objectives and desired future conditions for the affected areas and help determine the need for pest-related management action.

Management options exist to prevent and/or reduce future insect and disease-related mortality and associated unacceptable resource impacts. These options include regulation of stocking levels and species composition and specific actions to manage western dwarf mistletoe.

Among other factors, the size and diversity of the affected area essentially preclude trying to mitigate the forest health problems over the area as a whole in the short term. More site-specific FHP Biological Evaluations are needed to effectively assess insect and disease conditions in more detail and develop potential management alternatives. To facilitate this approach, the GH/CM District should identify and delimit specific geographical units of manageable size within the overall affected area where the increasing mortality is resulting in unacceptable negative resource impacts. Once these areas have been identified and prioritized, FHP Biological Evaluations can be conducted to provide more site-specific insect/ disease analyses and management alternatives for use by the GH/CM District in developing short and long-term management plans to reduce unacceptable insect and disease impacts.

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Route To:

Subject: Evaluation of Tree Mortality in the Piute Mountains, Greenhorn/ Cannell Meadow District, Sequoia National Forest

To: District Ranger, Greenhorn/ Cannell Meadow District

Enclosed is FPM Report No. C03-04 that summarizes observations made on the increasing conifer mortality in the Piute Mountains on August 5, 2003. Potential management actions are discussed. It is also suggested that the District consider (1) converting mortality volume estimates into units (e.g., tons/acre) that can be utilized by fire danger rating systems to help assess the potential impacts of the increasing mortality on hazardous fuel loads and increased fire danger and (2) establishing photo points to document vegetation changes associated with the increasing mortality and the efficacy/ consequences of subsequent resource management decisions.

Please contact me at (209) 532-3671 x323 if you have any questions or need additional information.

Sincerely,

JOHN M. WENZ
Entomologist

Enclosure

cc: Lew Jump, Sequoia NF SO
Tom Simonson, Sequoia NF SO
Ray Huber, GH/CM District